

# **EXHIBIT B**

(12) Public Utility Model Gazette (U)

(19) Japan Patent Office (JP)

(11) Publication Number of Utility Model Application

Utility Model Publication No. 1992-136787

(43) Date of publication: 12.18.1992

(51) Int. Cl. <sup>5</sup>	Identification code	Internal File No.	FI	Technology displayed in:
G07F 13/06	101	9028-3E		

Request for Examination: Requested (Total pages: 2)

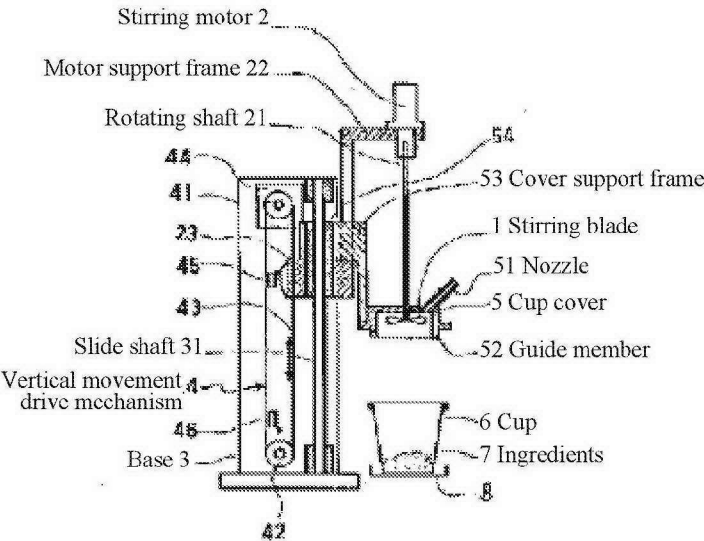
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(54) TITLE OF THE UTILITY MODEL: INGREDIENT STIRRING DEVICE FOR CUP TYPE BEVERAGE VENDING MACHINE

(57) ABSTRACT

<Object> To prevent beverage spills while stirring ingredients, and facilitate mutually aligning a cup and a cover in an ingredient stirring device that stirs ingredients inside a cup.

<Construction> An ingredient stirring device in a cup type beverage vending machine that dispenses a diluent water into a cup 6 containing liquid and/or powder ingredients 7 stirs the ingredients and diluent in the cup 6 to prepare a beverage, the ingredient stirring device including: a stirring blade 1 connected to one end of a rotating shaft 21 on a stirring motor 2; a base 3 that guides and supports the stirring motor 2, allowing the stirring motor 2 to move vertically; a vertical movement drive mechanism 4 mounted to the base 3 for moving the stirring motor 2; a cup cover 5 disposed on the rotating shaft 21 of the stirring motor 2 concentrically with the stirring blade; and a means for moving the cup cover 5 vertically.



**CLAIMS**

1. An ingredient stirring device in a cup type beverage vending machine that dispenses a diluent water into a cup containing liquid and/or powder ingredients, the ingredient stirring device stirring the ingredients and the diluent to prepare a beverage in the cup, the ingredient stirring device comprising:
  - a stirring blade connected to one end of a rotating shaft of a stirring motor;
  - a base that guides and supports the stirring motor, allowing the stirring motor to move vertically;
  - a vertical movement drive mechanism mounted to the base for moving the stirring motor;
  - a cup cover disposed on the rotating shaft of the stirring motor concentrically with the stirring blade;
  - and
  - a means for moving the cup cover vertically.
2. The ingredient stirring device according to claim 1, wherein the cup cover contains an inlet for a nozzle that dispenses the diluent.
3. The ingredient stirring device according to claim 1, wherein the bottom peripheral surface of the cup cover has a guide member which fits and positions the cup when the cup cover lands on the cup.

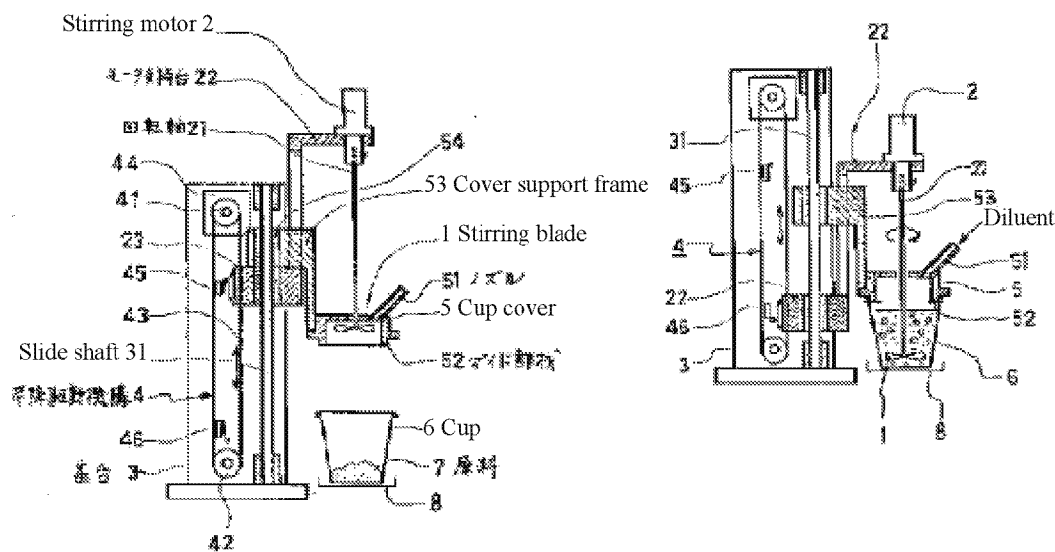
**BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 shows a configuration of the ingredient stirring device in standby mode according to an embodiment; and

FIG. 2 shows a configuration of the ingredient stirring device in FIG. 1 while stirring ingredients.

**EXPLANATION OF NUMERALS**

1. Stirring blade
2. Stirring motor
3. Base
4. Vertical movement drive mechanism
5. Cup cover
6. Cup
7. Ingredient
8. Cup conveyance mechanism
21. Rotating shaft
22. Motor support frame
31. Slide shaft
51. Diluent dispensing nozzle
52. Guide member
53. Cover support frame



## DETAILED DESCRIPTION OF THE UTILITY MODEL

<0001>

<Technical Field> The present utility model relates to an ingredient stirring device in a cup type beverage vending machine that serves a hot or cold beverage in a cup, more specifically, to cup type beverage vending machines where the beverage is prepared by adding hot or cold diluent water to various kinds of liquid and/or powder ingredients, such as coffee, cocoa, and/or syrup and stirring the same.

<0002>

<Prior Art> A conventional cup type beverage vending machine employs an ingredient stirring method wherein, upon receiving a vending command, the cup type vending machine dispenses a powder or liquid ingredient, and hot or cold water into a mixing bowl inside the machine and stirs the contents in the mixing bowl; the prepared beverage is then dispensed from the mixing bowl through a beverage hose into a cup discharged onto a vending stage.

<0003>

A cup type beverage vending machine employing this conventional method, however, has following problems. In the process of preparing and serving a beverage, insoluble residue from a beverage sticks to and remains inside the mixing bowl where the ingredients are stirred, as well as inside the beverage hose from which the beverage is subsequently served. Bacteria can grow and proliferate in the beverage residue over time when the machine is in prolonged standby, and the bacteria may contaminate the next serving of a beverage. This creates a public health issue. When the vending machine serves a viscous beverage such as a thick soup, or a soup with solid ingredients such as miso soup, these beverages tend to flow less freely and are more likely to cause clogs; the amount of the residue stuck in the system increases.

<0004>

These problems are usually addressed by frequently washing the mixing bowl and the beverage hose, but washing requires labor and time and is troublesome; these maintenance challenges have caused some to

give up on serving highly viscous beverages, as viscous beverages lead to a large amount of residue stuck in the system.

Various proposals have thus been made to address the above-described problems; these proposals include the following.

A serving method wherein a cup containing powder ingredients is stored in a cup supplying mechanism. On receiving a vending command, a machine discharges the cup containing powder ingredients onto a vending stage, and dispenses hot or cold water directly into the cup; a motor-rotated stirring blade enters inside the cup via a vertical movement drive mechanism and stirs and mixes the powder ingredients and the hot or cold water to prepare the beverage.

A serving method wherein a vending machine is equipped with a cup transport mechanism which receives a cup discharged from a cup supplying mechanism and transfers the cup through the machine to a product take-out window. The powder ingredients and hot or cold water are dispensed directly into the cup in sequence while the cup is in transit, and the powder ingredients and the hot or cold water are stirred and mixed inside the cup with an ingredient stirring means similar to the above-described method.

<0005>

According to these serving methods, the ingredients are stirred directly inside the cup, eliminating the need for the mixing bowl and the beverage hose and the like used when stirring ingredients outside the cup. This resolves the public health concerns due to the adhesion of beverage residue and removes the limitation on the types of beverages to be served; thus a machine can serve a thick soup, and a soup with solid ingredients, such as miso soup, and the like. The cup type beverage vending machine equipped with the ingredient stirring device wherein the stirring blade enters the cup is disclosed in, for example, Public Utility Model Gazette Publication No. 1979-95300.

<0006>

**<Problem to be Solved by the Present Utility Model>** With the in-the-cup stirring methods described above, if the stirring blade is rotated vigorously in order to thoroughly mix the ingredients, the beverage spills over or splashes from the cup.

In light of these problems, the goal of the present utility model is, in carrying out the in-a-cup stirring method using a stirring blade, to place a cover on a cup when stirring ingredients and the like to prevent the beverage from spilling out, and to provide an ingredient stirring device that facilitates mutual positioning of a cup and a cover.

<0007>

**<Means for Solving Problem>** To achieve the above-described object, the present utility model provides an ingredient stirring device in a cup type beverage vending machine that dispenses a diluent into a cup containing liquid and/or powder ingredients, the ingredient stirring device stirring the ingredients and the diluent in the cup to prepare a beverage, the ingredient stirring device including: a stirring blade connected to one end of a rotating shaft of a stirring motor; a base that guides and supports the stirring motor, allowing the stirring motor to move vertically; a vertical movement drive mechanism mounted to the base for moving the stirring motor; a cup cover disposed on the rotating shaft of the stirring motor concentrically with the stirring blade; and a means for moving the cup cover vertically.

<0008>



**<Operation of the Utility Model>** According to the above-described means, the stirring blade enters the cup by operating the vertical movement drive mechanism downward once the cup is positioned directly beneath the stirring blade. The cup cover is disposed concentrically with the stirring blade on the rotating shaft thereof; therefore the cup cover may be easily and accurately positioned relative to the cup to cover the upper surface of the cup by lowering the cup cover in conjunction with lowering the stirring blade via the vertical movement means. This enables the stirring blade to rotate without spilling any beverage, to ensure the complete mixing.

<0009>

**<Embodiment>** FIG. 1 and FIG. 2 show configurations of the ingredient stirring device according to an embodiment in a standby mode and during an ingredient stirring process, respectively. The ingredient stirring device is basically configured from a stirring blade 1, a stirring motor 2 which drives the stirring blade 1, a base 3 which guides and supports the stirring blade 1 and the stirring motor 2, allowing the same to move in a vertical direction, a vertical movement drive mechanism 4 which is mounted on the base 3 and moves the stirring motor 2 vertically, and a cup cover 5.

<0010>

Here, the afore-mentioned stirring blade 1 is connected to the lower end of a rotating shaft 21 attached to the stirring motor 2. The stirring motor 2 has an L-shaped motor support frame 22 mounted thereto and the tip thereof engages with a vertical slide shaft 31 mounted to the base 3 so that the slide shaft 31 guides and supports vertical movement of the stirring motor 2. Further, the motor support frame 22 is connected to a conveyer in the vertical movement drive mechanism 4 described below. The numeral 23 represents a slide bearing for the motor support frame 22.

<0011>

The cup cover 5 is a cap that covers an opening of a cup containing ingredients during the ingredient preparing processes described below. The cup cover 5 is loosely fitted onto the rotating shaft 21 of the stirring motor 2, and disposed concentrically with the stirring blade 1. The upper surface of the cover has an inlet for a diluent dispensing nozzle 51, connected via a hose to a hot water tank or similar diluent supply device (not shown). Further, the bottom peripheral surface of the cup cover has a protruding guide member 52 that fits the upper surface of the cup when the cover lands on the cup, to position the cup and the cup cover for a stirring operation. The cup cover 5 is mounted with a reverse-L-shaped cover support frame 53. The cover support frame 53 is supported by and positioned on the motor support frame with one end of the cover support frame fitting the aforementioned slide shaft 31. The numeral 54 represents a slide bearing for the cover support frame 53.

<0012>

The vertical movement drive mechanism 4 is configured from a conveyer 43 composed of a belt, wire or the like stretched parallel to the slide shaft 31 between upper and lower pulleys 41 and 42; a drive motor 44 connected to the pulley 41; and position detecting switches 45 and 46 which detect the vertical position of the motor support frame 22. Alternatively, the vertical movement drive mechanism 4 may be constituted from a feed screw mechanism employing ball screws instead of the aforementioned conveyer.

<0013>

When discharged, a cup indicated by a numeral 6 contains ingredients 7 such as powder or the like therein; the cup 6 is held and carried through the machine by a cup conveyance mechanism indicated by a numeral 8.

An ingredient stirring operation according to the above-described configuration is described next. In a standby mode, the ingredient stirring device is in the state illustrated in FIG. 1. Namely, in the standby state, the vertical movement drive mechanism 4 rests at a raised position. The motor support frame 22, as well as the stirring motor 2 and the cup cover 5 on the cover support frame 53, are also kept raised in the standby state.

<0014>

Here, a vending command initiates a series of serving operations; when the cup 6 containing the ingredients 7 arrives directly beneath the stirring blade 1 in the ingredient stirring position, carried thereto by the cup conveyance mechanism 8, an operation control unit (not shown) issues a command whereby the vertical movement drive mechanism 4 first operates downward to lower the motor support frame 22. This lowers the stirring motor 2 together with the stirring blade 1, which enters the cup 6 stationed directly thereunder from above. A detection signal from the position detecting switch 46 in the vertical movement drive mechanism 4 is used to determine the stop position during descent of the stirring blade. When the stirring motor 2 descends, the cup cover 5 follows along with the cover support frame 53. Further, when the cup cover 5 lands on the upper surface of the cup 6, as shown in FIG. 2, the cup cover 5 is separated from the motor support frame 22, stops moving and covers the top surface of the cup 6. This enables correct landing of the cup cover upon the top surface of the cup 6 regardless of the height of the cup 6. Moreover, the cup is automatically aligned correctly relative to the cup cover when the cup cover lands on the cup because the cup cover 5 is disposed concentrically with the stirring blade 1. Additionally, the guide member 52 constructed on the cover easily fits the top opening of the cup 6 in advance and provides the exact positioning by aligning the cup 6 with the center of the stirring blade 1. The guide member 52 may be constructed to fit the outer edges of the cup 6. This cup positioning maneuver prevents the cup from coming into contact with the stirring blade 1.

<0015>

Once this state is achieved, a given amount of hot or cold diluent is subsequently dispensed into the cup 6 through the nozzle 51 in the cover 5, followed by startup of the stirring motor 2. The stirring motor 2 rotates the stirring blade 1, thereby stirring and mixing the ingredients and the diluent inside the cup 6 to prepare the beverage. Here, once a given stirring time elapses, the stirring motor 2 stops, the vertical movement drive mechanism 4 ascends along with the motor support frame 22 which raises the stirring motor 2 and the stirring blade 1 out of the cup 6. During this raising process, the motor support frame 22 also raises the cover support frame 53 and the cup cover 5. Once the motor support frame 22 reaches the standby position, the position detecting switch 45 activates to stop the vertical movement drive mechanism 4. A series of these ingredient stirring operations programmed into the operation control unit. Once the aforementioned ingredient stirring process is complete, the cup conveyance mechanism 8 starts to move again to deliver the cup containing the beverage to the product take-out window.

<0016>

In the ingredient stirring process described above, the vertical movement drive mechanism 4 may be operated so that the stirring blade 1 reciprocate vertically inside the cup 6 to the extent of not pushing up the cup cover 5; this provides more effective stirring of the ingredients. Moreover, a small amount of hot

water may be dispensed into the cup cover 5 through the nozzle 51 while rotating the stirring blade immediately before the completion of ingredient stirring, to rinse the stirring blade 1 and the inner surface of the cup cover 5 as the stirring blade 1 is being pulled up from the cup.

<0017>

<**The Effectiveness of the Utility Model**> According to the present utility model described above, an ingredient stirring device comprises a stirring blade connected to one end of a rotating shaft of a stirring motor; a base that guides and supports the stirring motor, allowing the stirring motor to move vertically; a vertical movement drive mechanism mounted on the base for moving the stirring motor; a cup cover disposed on the rotating shaft of the stirring motor concentrically with the stirring blade; and a means for moving the cup cover vertically. This construction uses a simple configuration to facilitate aligning and attaching a cover to a cup, and thus provides a cost benefit. Additionally, since the beverage does not spill, ingredients can be stirred more vigorously, and even the beverages with harder-to-dissolve ingredients can be prepared well.